

5. Management Plan

The Office of FreedomCAR and Vehicle Technologies (OFCVT) maintains overall authority and responsibility for managing and implementing DOE's FCVT Program. Contract execution and administrative authority for many program elements are delegated to DOE's operations and field offices. OFCVT also works with the EERE regional offices, State Energy Offices, and National Association of Energy Offices for implementation of technologies at the regional and state level. This section describes how the portfolio of FCVT research activities will be managed and implemented.

5.1 PROGRAM MANAGEMENT

The DOE organizational structure responsible for managing the FCVT Program, including implementing the R&D Plan, is shown in Figure 22. The program resides within the Office of EERE and is one of 11 programs reporting to the DOE Assistant Secretary for EERE. Management responsibility for the FCVT resides with the Program Manager of FCVT, who reports to the Deputy Assistant Secretary for Technology. In addition to managing day-to-day implementation of its research activities, OFCVT is responsible for implementing agency policy, formulating and modifying this Program Plan, justifying and allocating resources, coordinating the various activities, establishing priorities among program activities, evaluating progress, coordinating with other government and private-sector organizations, and reporting to senior DOE management.

OFCVT has established four technical teams (see Figure 22), which are responsible for day-to-day management of the FCVT R&D activities. Management responsibilities for these teams are shown in Table 44. Contract administration and support is provided to FCVT by appropriate organizations at DOE Headquarters, operations offices, and field offices. Technical assistance is provided by selected personnel from the national laboratories who have expertise in many of the technologies addressed by the FCVT Program.

The OFCVT management structure, processes, and procedures are designed to ensure the overall effectiveness of the FCVT research agenda in terms of the following:

- setting R&D priorities and allocating resources in ways consistent with the mission and objectives of DOE and EERE
- obtaining the best available expertise in each technical area within industry, the national laboratory system, and universities
- conducting high-value R&D
- managing costs
- ensuring the high quality of work through strong oversight and internal program/external peer reviews
- transferring results to customers and otherwise responding to their needs
- achieving close coordination with government and industry partners

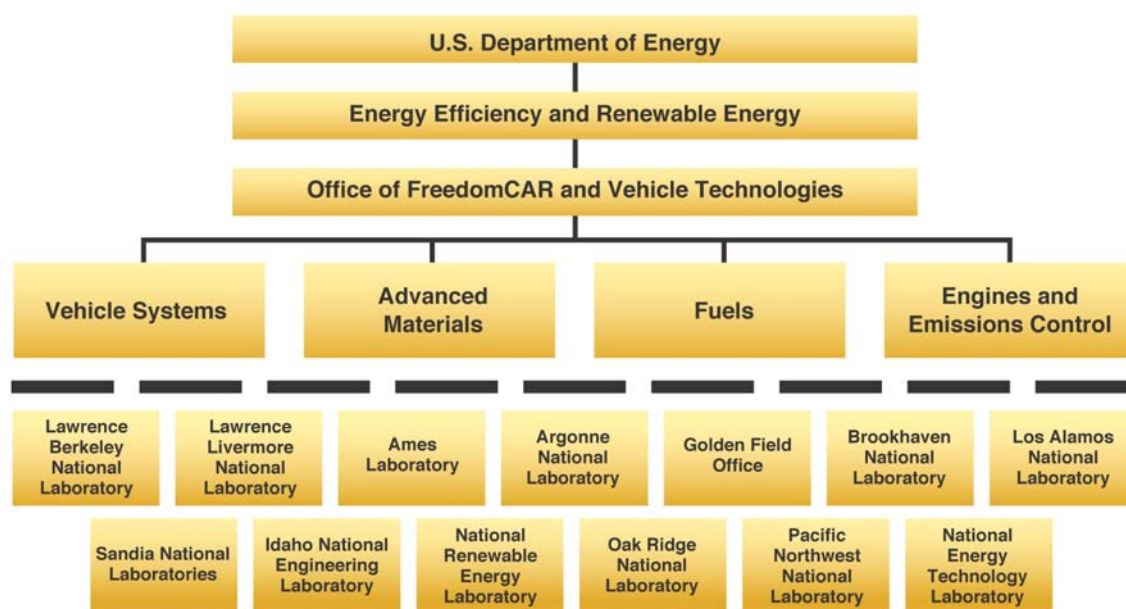


Figure 22. Department of Energy/Office of FreedomCAR and Vehicle Technologies organizational structure.

Table 44. FCVT Management Team responsibilities

Vehicle systems	Advanced materials	Fuels	Engines and emission control
<ul style="list-style-type: none"> Heavy Vehicle Systems Ancillary Systems Simulation/Validation Energy Storage Advanced Power Electronics Hybrid and Electric Propulsion Testing and Evaluation 	<ul style="list-style-type: none"> Propulsion Materials (heavy and light) Lightweight Materials (High-Strength Weight Reduction and Automotive Lightweighting Materials) High Temperature Materials Laboratory 	<ul style="list-style-type: none"> Advanced Petroleum-Based Fuels Non-Petroleum Fuels and Lubricants Energy Policy Act 	<ul style="list-style-type: none"> Combustion and Emission Control Light Truck Engine Heavy Truck Engine Waste Heat Recovery Off-Highway Vehicles

OFCVT is committed to embracing the best management practices and continuing to be an organization with which its industry partners and stakeholders prefer to do business. Reflecting the overall priorities of DOE's strategic management process, OFCVT seeks continuous improvement in programmatic efficiencies through establishing clear lines of authority with minimal layers of management and through eliminating duplicated effort. An effective, flexible management structure has evolved within which different levels of management are performed at headquarters, field, and operations offices and at the national laboratories to capitalize on the strengths of each type of organization. To implement the various R&D efforts, OFCVT contracts directly with national laboratories, universities, and industries; cooperates with industry consortia; or delegates contracting and technical management authority to national laboratories or field offices. Implementation of R&D efforts with industry is carried out through competitive solicitations. Special competitive procurements are also aimed at small

businesses and universities. National laboratories are directly funded based on their capabilities and performance. When appropriate, OFCVT creates and maintains synergistic, non-duplicating centers of excellence in the national laboratories. In determining the appropriate management approach for each activity and assigning management responsibilities, several criteria are considered:

- ability to acquire the necessary expertise—for example, in technical management or procurement
- proven track record of responsiveness and results
- expertise and facilities required to accomplish the desired work
- involvement of organizations expected to use/commercialize the results of the work
- productivity and efficiency

In a time of constrained budgets, actively balancing and managing the R&D portfolio is of vital importance. Given the large number of promising technologies and multitude of R&D approaches for each technology, effective management processes for setting R&D priorities and allocating resources are required. A decision and risk analysis methodology is employed to screen and compare priorities for the overall efforts and technology selection. The OFCVT management team, in coordination with the industry partners, defines and reviews strategic alternatives, finalizes selection criteria, reviews analyses conducted by support personnel, and makes decisions regarding program content, structure, and priorities.

In establishing technical direction and priorities, the program has obtained substantial input from energy and transportation experts from outside DOE through the interaction of government–industry–laboratory technical teams, independent reviews with selected panelists, solicited review of DOE R&D plans, and critiques by organizations such as the National Academy of Sciences. The perspectives of these outside experts are extremely valuable in helping to ensure that the program’s research directions and priorities are aligned properly with the needs of auto and heavy vehicle manufacturers, equipment suppliers, energy companies, other federal agencies, state agencies, consumers, and other stakeholders. In addition, the program invests in technical program and market analysis and performance assessments in order to direct effective strategic planning.

Independent peer reviews of the program are an integral part of OFCVT’s management process. Feedback from such reviews often identifies areas within which corrective measures are required and provides information that DOE management can use for continual improvement of its R&D efforts.

5.2 PERFORMANCE-BASED PLANNING, BUDGETING, EXECUTION, AND EVALUATION

The Program will follow the EERE management system as depicted in Figure 23.

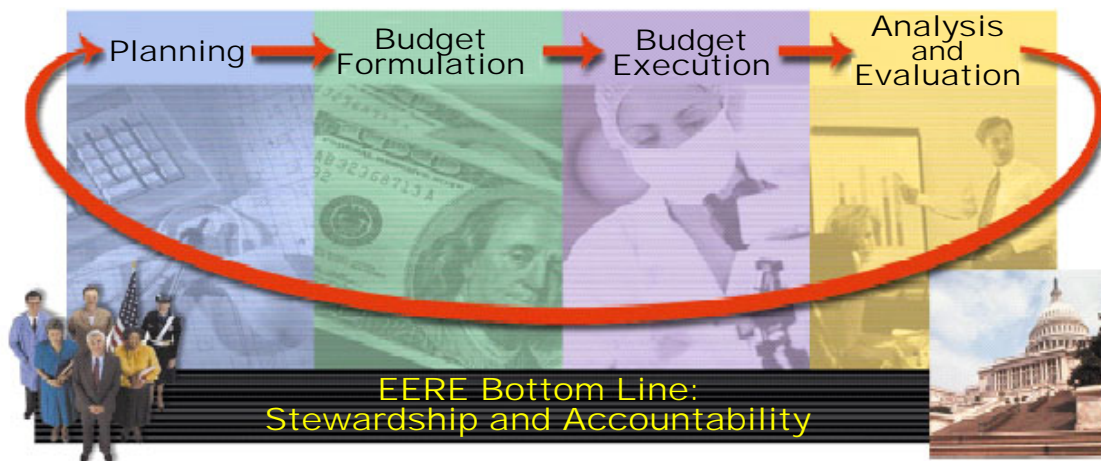


Figure 23. The four phases of EERE program management.

Program Planning

The National Energy Policy and the EERE Strategic Plan provide the planning foundation for the FCVT Technologies Program. The FCVT Program establishes priority goals that support the National Energy Policy and the EERE Strategic Plan and are aligned with the FreedomCAR and Hydrogen Fuel Initiative, the FreedomCAR and Fuel Partnership, and the 21st Century Truck Partnership (21st CTP). The FCVT priority goals flow down to the appropriate activities. Within each activity, additional time-phased goals and technology targets have been established to address the critical technology barriers. This plan then identifies tasks, milestones, and schedules out to the year 2008 to meet the time-phased goals. The FCVT priority goals are included in Section 5.4.

Program Budget Formulation

The budget falls under the jurisdiction of the Interior and Related Agencies Appropriations Subcommittee of the U.S. Congress. Program budget performance is regularly evaluated by the Office of EERE through regular management reviews and the Annual Budget Summit. In addition, the Office of Management and Budget, in consultation with the Office of Science and Technology Policy, evaluates the Program budget performance annually from September through November prior to each new fiscal year. Each year, the Program reports the current status against the pre-established FCVT priority goals and performance measures. Budget resources are requested from Congress based on a number of factors. Foremost is that each of the activities must fall within the DOE, EERE, and FCVT Program mission and not another program or agency. Furthermore, it must be an activity that industry is not funding or would not fund by itself.

Program Budget Execution

Within each of the activities, the R&D tasks are executed by an industry contractor, a national laboratory, a university, or a team composed of these entities. Within each activity, tasks are prioritized by analyzing the current status against the out-year targets. Industry-contracted research is awarded through competitive

solicitations. Depending on the risk, the federal cost share is usually between 50% and 80%. University research is also awarded through competitive solicitations, and the federal cost share is usually 80% or more.

Program Analysis and Evaluation

Evaluation is conducted at the program level and sub-program levels. Peer reviews conducted by the National Research Council, or an equivalent independent group, will be carried out every two years. Program budget performance, financial management, and overall program management are evaluated on a periodic basis by EERE management.

DOE managers of the sub-programs semi-annually review all national laboratory and industry work. An annual progress report for each activity documents the data and progress achieved.

5.3 EXTERNAL COORDINATION

FCVT coordinates its research with its industrial partners, with other offices within EERE, with other offices within DOE, and with others through education and outreach.

U.S. Council for Automotive Research

OFCVT is the lead organization within DOE for the FreedomCAR and Fuel Partnership, a research partnership between DOE, the auto industry's U.S. Council for Automotive Research (USCAR), and five major energy companies. As the lead government organization, FCVT serves as the department's FreedomCAR and Fuel coordinating office and, in that capacity, will coordinate DOE FreedomCAR and Fuel matters with USCAR and the five major energy companies. The management structure for the FreedomCAR and Fuel Partnership is shown in Figure 4 of this plan.

Twenty-first Century Truck Partnership

FCVT is also the lead government office for 21st CTP. This partnership between the trucking industry and the government has the objective of significantly reducing the petroleum dependence of medium- and heavy-duty trucks. The government and industry participants in 21st CTP are shown in Figure 5 of this plan.

DOE Office of Hydrogen, Fuel Cells and Infrastructure Technology

The Office of Hydrogen, Fuel Cells and Infrastructure Technology (HFCIT), within EERE, is responsible for DOE's hydrogen research and the FreedomCAR and Fuel Partnership fuel cell research of the FreedomCAR and Hydrogen Fuel Initiative. Included within the mission of HFCIT are research and engineering development in the areas of hydrogen production, storage, and utilization for the purpose of making hydrogen a cost-effective energy carrier for transportation applications; and research, development and validation of fuel cells for transportation applications. Therefore, FCVT collaborates closely with HFCIT to ensure that the FCVT transportation vehicle technologies and the HFCIT hydrogen and fuel cell technologies are implemented in a synergistic fashion.

DOE Office of Fossil Energy

EERE and the Office of Fossil Energy are jointly conducting a government/industry program to develop (1) a portfolio of ultra-clean highway transportation fuels that can be derived from domestic feedstocks and (2) advanced technologies that will enable their market-viable production and nationwide distribution. This effort, the Ultra-Clean Transportation Fuels Program, addresses all elements of the vehicle power system (i.e., fuel, engine, emissions control) using an integrated systems approach.

Within the Ultra-Clean Transportation Fuels Program, the Office of Fossil Energy is responsible for the development of ultra-clean fossil-based fuels (including those that incorporate non-fossil fuels as blending stock) and associated fuels production technologies. EERE is responsible for biofuels development and production technologies and for engine/emissions-control technologies. FCVT and the Office of Fossil Energy, collaborating on the engine/emission-control technology development dimension of the Ultra-Clean Transportation Fuels Program, are conducting research to identify the optimum fuel formulations and properties for efficient, clean engine and fuel cell reformer operation.

DOE Office of Science

EERE-managed research activities are often leveraged with Office of Science research. These leveraged activities include co-funding of the Combustion Research Laboratory, using Office of Science–procured massively parallel computers for vehicle crash modeling, and performing applied research in the Advanced Photon Source. Many technologies discovered in the Office of Science Basic Energy Sciences Program are carried through applied research by this program and others within EERE.

Education and Outreach

The FCVT Program has efforts in education and outreach, including Graduate Automotive Technology Education (GATE), Advanced Vehicle Competitions, and the Technology Introduction portion of the Energy Policy Act of 1992 (EPAct) Replacement Fuels. The GATE effort aids in the development of interdisciplinary curricula to train the future workforce of automotive engineers. This is accomplished by setting up GATE Centers of Excellence at universities that have been competitively selected, establishing a focused curriculum, and providing funds for research fellowships. Advanced Vehicle Competitions provide educational opportunities for university students while pursuing novel approaches to and demonstrating the performance of critical vehicle technologies identified by DOE and its partners. Many students who graduate from these vehicle competitions go on to take jobs in the auto industry, where they bring with them an unprecedented appreciation and understanding of advanced automotive technologies. The Technology Introduction effort accelerates the adoption and use of alternative fuel and advanced technology vehicles to help meet national energy and environmental goals. This effort logically follows and complements successful technology development by industry and government. The primary functions of Technology Introduction include legislative and rulemaking support for EPAct alternative fuel

and fleet efforts, testing and evaluation of advanced technology vehicles, and advanced vehicle competitions. As identified in the National Energy Policy, consumer education and demonstration efforts are critical to accelerating the use of advanced energy technologies.

5.4 FCVT PRIORITY GOALS

The FCVT Program supports the “Energy Strategic Goal” of the Department of Energy’s Strategic Plan *to protect our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally sound energy*. The FCVT Program priority goals contribute to the “Energy Strategic Goal” by developing technologies that can enable cars and trucks to become highly efficient by means of R&D that provides clean power technologies, and improved domestic fuel specifications that work in concert with advanced power systems. In addition, the program R&D will focus on reducing the cost and improving other attributes of advanced vehicle technologies so that they will be both performance-competitive and cost-competitive. These priority goals are the following.

Priority Goal 1a. Heavy Vehicle Systems: measured parasitic losses (aerodynamics, cooling, compressed air) as a function of engine output (Figure 24).

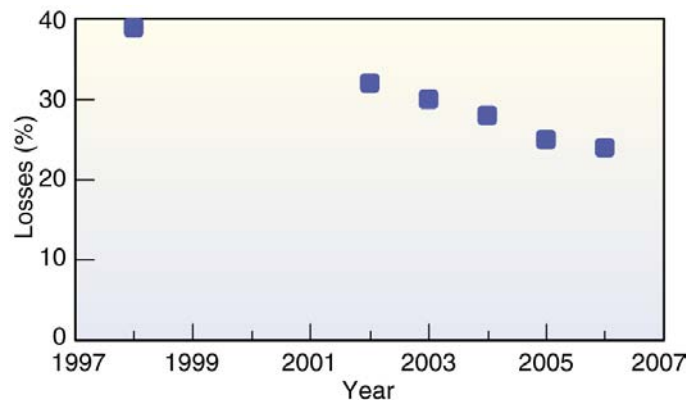


Figure 24. FCVT Performance Measure 1: Heavy vehicle parasitic losses.

Priority Goal 1b. Materials Technologies: truck weight (Figure 25).

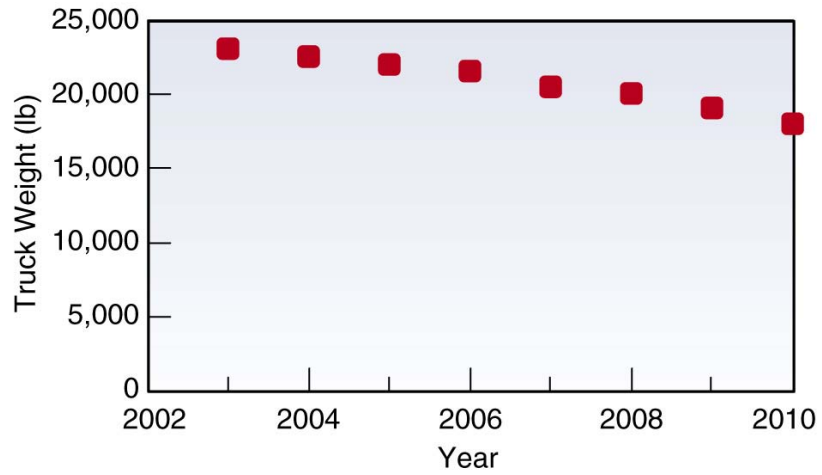


Figure 25. FCVT Performance Measure 6: Heavy tractor-trailer unloaded weight.

Priority Goal 2. Hybrid Electric Propulsion: cost per 25-kW battery system (Figure 26).

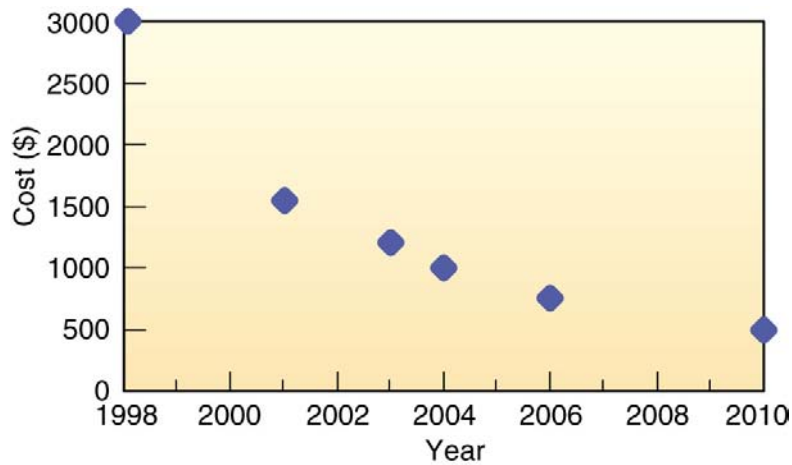


Figure 26. FCVT Performance Measure 2: Cost per 25-kW battery system.

Priority Goal 3. Advanced Combustion Engine R&D: efficiency of light- and heavy-duty internal combustion engines (Figure 27).

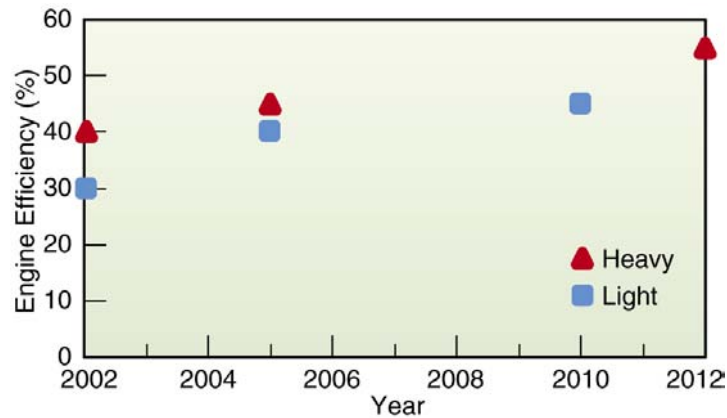


Figure 27. FCVT Performance Measure 3: Efficiency of light- and heavy-duty internal combustion engines.

Priority Goal 4. Materials Technologies: cost of carbon fiber (Figure 28).

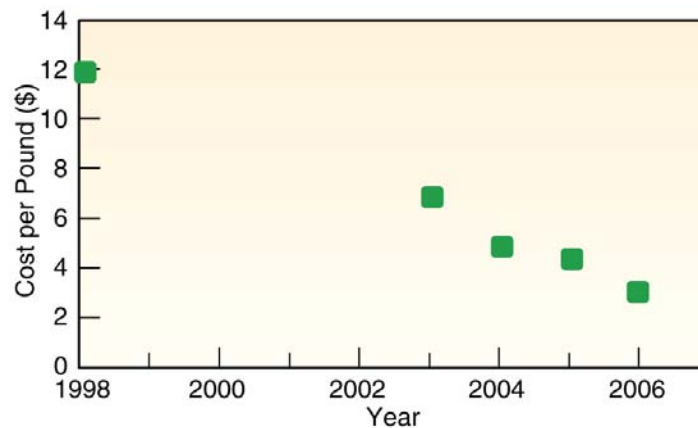


Figure 28. FCVT Performance Measure 4: Cost of carbon fiber.

To assess progress toward achievement of these priority goals, targets have been established at intermediate dates. These are indicated in the charts. At the tactical level, technical targets have been established as presented throughout Section 4 of this Plan. FCVT-developed technologies are evaluated to validate that the FCVT-developed component/subsystem technologies meet the technical targets. This validation process involves the following methods:

- Computer simulations using the vehicle models updated with embedded component/subsystem models that virtually replicate the technology-representative point designs developed in the FCVT component/system technology development activities.
- “Hardware-in-the-loop” testing that replicates a complete vehicle by employing a blended combination of (1) actual test hardware provided by the FCVT component/subsystem technology development activities and (2) computer models.

